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ABSTRACT

The scientist who uses the experimental form does so in order to explain that which is verified through prediction. The prerequisites for prediction include a universe that is ordered, stable, independent, and knowable. Some assumptions of the predictive argument with respect to communication research are: the operating elements of the message are known, the message is perceived with communality across subjects, the evoking message and the behavior measured or the manipulation used generalize to a class of messages and behaviors or manipulations, the receiver state is known or is equivalent across subjects, the receiver states established during the manipulation can occur in a noncontrolled environment, the behavioral alternatives measured are not dependent solely on the conditions of manipulation, the interaction between the behavior and the entity of record are equivalent across subjects, the entity of record will generalize to a class of such entities or to other classes or recording entities, the known properties of the entity of record are related to the behavior measured, the conditions of manipulation have some equivalence in the noncontrolled environment, and the probability of the noncontrolled environment presenting equivalent conditions is of a significant value. Predictive arguments themselves can be causal, conditional, stochastic, or modeling, and differences among these depend on a priori theory and on statistical analysis. Reports of differences must deal with the importance of the area, the significance of the prediction, and the appropriateness of testing conditions. (TJ)

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Research as Argument: The Experimental Form

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RESEARCH AS ARGUMENT: THE EXPERIMENTAL FORM

INTRODUCTION

The scientist who works in the experimental form, as we shall use the term, develops explanation for verification in prediction. These predictive statements are expressed in hypothetic explanations which are then tested in some deductive model. For example, one explanation for the presence of aggressive behavior in television viewers is the prior viewing of mediated violence. This statement predicts that given mediated violence, and certain other conditions, aggressive behavior in the viewer will follow. Clearly this is only one explanation out of an infinitude of explanations for the occurrence of aggressive behavior. The argument for acceptance of this particular explanation will be constructed by producing evidence that the prediction works -- turn on Starsky and Hutch and a brawl in the viewing room follows. The power of the prediction is determined by the number of conditions which must be imposed--turn on Starsky and Hutch and a brawl in the viewing room follows given that the viewers have just been angered, see one another as suitable targets for aggression, operate in a social context where aggression is acceptable, perceive aggression as an acceptable mode of behavior, have the means to aggress and perceive positive consequences as the outcome of the aggressive act. Obviously the fewer the conditions the more powerful the prediction. It is in the showing that the prediction works that verifies the explanation; it is in the detailing of the conditions under which the prediction will work which defines its utility.

UNIVERSAL PREREQUISTIES FOR PREDICTION

In order to use prediction as a form of argument the experimentalist

needs a universe which is ordered, stable, independent and consequently knowable.

Taking each in turn, a universe is ordered when elements exist in relation to one another. Order is a requisite for the predicting statement no matter what the particular form. Where elements are in random array vis a vis one another, it is possible only to describe each element independently. It is not possible to predict the action of one variable given the knowledge of another. This order may, of course, exist in the elements or may be imposed upon them.

The universe must also be relatively stable in the ordered patterns it presents for the predictive statements to have value or power. The value of a predictive statement is certainly its rate of success. If the universe is ordered, but that order changes rapidly, then predictive statements can be made but will maintain value only for that period of time in which the pattern holds. Change itself may be random or patterned. If random, the predictive statement may never have value again. If patterned, it is then possible to predict when the statement will and will not have value.

Finally the experimentalist assumes that the data--the elements under study--exist independently of the explanation. That is the predictions are more than self-fullfilling. The constructs of aggression, values, attitudes, correspond to actual things in the universe which perform regardless of our knowledge of them. It is this notion of independence which permits the experimentalist to work in the reduced environment of the laboratory and then to generalize to other environments or all environments.

In this ordered, stable, independent world prediction is possible, and our knowledge of this world can be measured by the number of

successful predictions that we can make. This world makes even knowledge knowable.

ASSUMPTIONS OF THE PREDICTION ARGUMENT

The predictive or prospective argument carries its share of assumptive baggage. When we accept the argument we also accept the burden of these assumptions. To identify those assumptions, consider the study of communication within this perspective as concerning itself with the interrelationships among four elements, the characteristics of the message, the conditions of reception, the behavioral alternatives, and the entity of record. Stated in a compact sentence the experimental study of communication is contained in: The consequences of a message are relative to the state of the receiver, the behavioral alternatives available and the entity of record. Where: A message is any occurrence to which meaning is attached by the receiver. The operational parameters of the message are defined by the perception of the receiver. A receiver state is the sum total of forces generated by multidimensional motivational sets influencing the perception of the message the behavioral alternatives and the reinforcement contingencies. The available behavioral alternatives are those responses perceived by the respondent as being potentially reinforcing within the operating context. The entity of record is the measurement device, observer or whatever which generates data which have known properties.

Whether you agree with this formulation or not, we can use it to highlight the basic assumptions of the prospective method. Those assumptions are:

*That the operating elements of the message are known. This is the old, "I've tried scotch and soda, gin and soda, vodka and soda and gotten drunk on them all--it must be the soda" routine. It is an assumption of no

mean magnitude that the characteristic used to identify a message is also the characteristic which evokes the measured behavior.

*That the message is perceived with functional communality across subjects. It is further presumed that the operating element(s) remain constant across subjects. The significance of this presumption becomes apparent when the researcher attempts to reason outside of her paradigm. The relationship found between message and consequence may prove artifactual.

*That the evoking message and the behavior measured or the manipulation used generalize to a class of messages and behaviors or manipulations. If a researcher uses a film clip from the Champion he does so to represent a class of messages called violence. Similarly if the device of electrical shocks is used as the response, it is used to generalize to a class of aggressive responses. And finally the complete manipulation in this formulation is not perceived as limited to the experimental conditions but as appropriate to other circumstances presumed to be of the same class (e.g., watching television).

*That the receiver state is known or functionally equivalent across subjects. Receiver states have traditionally been ignored. Pre and post test designs are particularly dependent on the assumption of constancy of receiver state with the exception of the measured condition. Rarely is any evidence presented to justify this assumption. When a researcher uses a manipulation of receivership state it is necessary that the subjects arrive at states of equivalent value before they can be commonly classified and before the manipulation of explanatory value.

*That the receiver states established during the manipulation can occur in a non-controlled environment. It may be that the conditions of the manipulation are so esoteric that they produce receiver states not encountered in the "natural environment."

*That the performance of the behavioral alternative(s) chosen to be measured are not solely dependent on the conditions of manipulation. Experimental conditions limit the potential responses in order to produce the optimal conditions leading to the behavior to be measured. These conditions may never occur in the non-controlled environment or the behavioral alternative may never have been part of the repertoire of the respondent.

*That the interaction between the behavioral response and the entity of record are functionally equivalent across subjects. Since behavior has characteristics (e.g., it is continuous and not wholly observable) which are not amenable to data transformation, the entity of record must reduce and otherwise change the behavior to fit its receptive frame. In order to produce data with the same values this process must be consistent across subjects. The supposition is that the design of the instrumentation has properly accounted for and represents all potential response variants, and, therefore, a four is a four is a four.

*That the entity of record will generalize to a class of such entities and/or to other classes or recording entities (e.g., people, events in an environment). The first part of this assumption is the concept of construct validity. The second part deals with the inferential value of the instrumentation used.

*That the known properties generated by the entity of record are isomorphically related to the behavior measured. This assumption has been commonly noted. We offer no new insights but highlight the fact that the assumption is double-barreled. The entity of record first reduces the behavior to fit its receptive frame. It then transforms the behavior into data which approximate known properties.

*that the conditions of manipulation have some functional equivalence

in the non-controlled environment, and

*That the probability of the non-controlled environment presenting functionally equivalent conditions is of a significant value. These last two assumptions form the criterion of utility to which we shall return.

FORMS OF PROSPECTIVE ARGUMENTS

Not all forms of predictive argument arise from the traditional picture of the social physicist puttering about in the laboratory. I believe I have found four different forms of the prediction argument appearing in the literature, a) causal, b) conditional, c) stochastic, and d) modeling. We will examine the construction of each.

Causal Statements

The classic experimental form of argument has been tied to the notion of causation in which the independent event is the immutable force which brings about the dependent event. Sufficient heat and oxygen will cause this paper to burn. It will not burn without them and will always burn with them. The simplicity of the causal argument has great attraction. This paper cannot inexplicably burst into flames. For, everytime it does burn, we know that sufficient heat and oxygen were present. We always have an explanation for the event.

Causal arguments work best when the antecedent condition is both necessary and sufficient. They work less well when there are a small number of sufficient causes. They work poorly when the antecdent condition varies in sufficiency. That limitation, of course, is exactly the problem with the causal form. It demands perfection and permits no error.

When error does occur the causal theorist can only assume that the antecedent condition has not been adequately identified. Work then is

directed toward the examination of the elements of the antecedent conditions to identify the causal factors. Causal research, consequently, is elemental in nature dealing with small independent units existing in the fabric of the environment which hold the key to the pattern thereof.

It is hardly a contentious statement to say that the discipline of communication as well as social sciences in general have not been successful in developing causal explanation. This failure perhaps explains its limited use and the much greater use of the conditional form.

Conditional Statements

The conditional form identifies some event which can be predicted within some range of probability given an antecedent condition which can be specified. That is: Three times out of ten X leads to Y or in less precise reading: X usually leads to Y. This form makes no brief for the notion of absolute control rested in causative arguments, but states that X is a condition for the appearance of Y or that x is linked in a consequent relationship to Y. While abandoning causation the conditional argument still holds that manipulation of the antecedent condition will have effects on the consequent variable. The argument form then is still reductionistic. That is the greater the number of successful conditional relationships that we can specify the fewer the number of explanations that are needed. Ultimately explanation should reduce to a limited few or even a single one.

Stochastic Statements

Stochastic models of reality operate somewhere between the causal/conditional construction and the process models of say ethnology. The stochastic models of systems research and the rules perspective have retained the notion of manipulation of the antecedent condition. Outcomes, however, are usually not seen as consequents of the manipulation

but as subsequents to it. The stochastic model specifies all possible outcomes or all relevant outcomes, to the particular antecedent condition and the relative probability of each of these outcomes. These specifications are done without restricting the outcomes in number of kind or limiting the specified outcomes to the particular antecedent condition. That is, an antecedent condition can have any set of outcomes and a given outcome can be linked to any antecedent condition.

Stochastic models tend to resist generalization beyond the particular context and consequently are not directly reductionistic. They can be viewed, however, when manipulation is involved, as experiments bound in time and context.

Modeling Statements

One final predictive form has risen from the continuing development of computer software in multivariate statistical analysis. This model building approach begins with some set of variables thought to be related and seeks to develop a model to describe the relationship within the set. Typically there is no a priori prediction as to the structure of the model. There may have been experimenter manipulation of the variable or the values may be "naturally occurring" (e.g., an election). Because some model will always be formed, the strength of this argument resides entirely in the fraction of the dependent variance accounted for. If high, the research can claim confirmation of this prediction of a useful relationship among the variables chosen. The model itself, of course, must await confirmation in a new study.

CHARACTERISTICS OF ARGUMENT FORMS

There are clear differences among the four argument forms in terms of dependence on a priori theory and dependence on statistical analysis. In general as one moves from causal arguments to modeling one becomes less

dependent on presupposed theory and more dependent on analysis. Causal arguments are entirely a confirmation of a priori theory. Modeling arguments are retrospective explanations for a collected data set. Causal arguments need no statistical analysis; modeling arguments are entirely statistical. Conditional and stochastic forms hold the middle ground.

PERSUASIVE TASKS AND EVIDENCE

While these differences show themselves in the changing emphases within the report, all such reports regardless of approach, would appear to have the same five persuasive tasks to accomplish in order that the reader will be in agreement with the author. First the report must convince the reader of the importance of the problem area; second that the prediction made is not foolish or trivial; third that the testing conditions are appropriate; fourth that the events predicted have occurred in the manner predicted; and fifth that the predictions can generalize or have utility beyond the specific test.

In accomplishing these tasks, authors in the experimental perspective make use of some seven levels of evidence: (1) the assertion; (2) the assertion by an expert; (3) the assertion by the author as an expert; (4) compelling experiences or anecdotes; (5) reported systematic observations; (6) systematic observations by the author; (7) repeated systematic observations. While we can quibble about the relative rankings, these seven form a rough hierarchy of acceptability though certainly not use as the lower end on the scale makes more appearance than the upper.

These seven are the tools by which our five persuasive tasks typically get done. The next sections examine each of these task performances in turn.

Importance of the Problem

On the face of it what makes a problem important is in the impact of its solution. Most research is far removed from the solution; consequently, appeals for the importance of a problem generally take one of two tacks: a) It has appeared in the literature before as in, "Fascination with the human eye has a long history. Records from ancient times contain references as to the pervasiveness of the look. . ." (Cegala, et al., 1979, p. 99). Or b) it is a truism of our culture as in, "Television news has for many years been identified as the primary source of information about what is going on in the world. . ." McCain and Ross, 1979, p. 121).

The importance of many research problems are pre-determined by outside agencies. We are all aware that interest in research problems runs in cycles or bads as with any other interest. Whatever is current is de facto important. The foundations and federal funding agencies play a major role in determining the research agenda. Our journal editors make similar decisions.

Significance of the Prediction

For a prediction (hypothesis) to be acceptable it has to integrate with the folk knowledge of our discipline and cultural experience. It is, for example, well accepted for one to predict that TV content will affect behavior or that the state of the receiver will affect behavior given a TV content. It is not acceptable to predict that it is the gamma rays from the cathode tube which predicts behavior. Even if such a prediction would work, we would not accept it, complaining that surely there is some third variable or that it is a poorly explained notion and the like.

The typical method for integrating is to appeal to the literature. In most cases authors look for the appearance of similar uses of the terms

of their own hypotheses which they then cite or in rare cases quote. Compelling experience or anecdotes are also commonly used.

The hypothetic-deductive approach is a method for chosing among alternatives. Prior to the test, all alternative explanations have equal standing; they are all untested hypotheses. It is, in part, the reductionistic nature of experimental theory and, in part, the need for maintaining membership in the social structure of our science which requires that the proposed hypothesis fit current fashion.

Testing Conditions

We are perhaps least successful in providing a defense of our testing conditions. Tucked away in small print under the rubric of "Method," descriptions of testing conditions are models of cryptic prose. Few descriptions are adequate for even rudimentary understanding much less replication; none provide the exceptions and adjustments that are made in every study.

It is curious to me that we assign so little import to the testing conditions. The whole of whether the findings are substantive or artifactual resides in them. Yet, we do not require our authors to provide a defense of them beyond the bald assertion.

The argument for the validity of the testing conditions appears to be a victim of the space crunch on our journals. It is a grevious loss. Research in our discipline is scarecely pure. It is almost always directed toward providing an explanation of behavior in everyday life. If the conditions do not generalize then the findings, replicable or not, are useless. If authors use film to conclude about the effects of television or speech 101 male students to stand for people, the reader deserves an argument for the substitution.

Verifying the Prediction

The fact that experimentalists use measures which are of noticeable distance from the everyday events to which they wish to apply and the fact that the consequences of the manipulation are differential across respondents have moved this task to a dominant position in the argument.

The distance of measures from everyday life evokes the need for evidence of validity--that these measures can stand for the actual events under study. Most times we substitute an argument for the reliability of a measure. This argument is based, generally, on the mistaken notion that events must necessarily occur again in the same way. Reliability of this sort can be easily generated by removing the specificity or sensitivity of the measure. The less sensitive a measure the wider the latitude of events which are recorded as the same, The wider the latitude the more reliable the measure becomes but, of course, the less valid.

The validity problem is solvable if we are willing to move our measures closerto the ordinary behaviors we traffic in each day. Unfortunately such measures require training, are time consuming to collect and usually involve real dollars; little is less costly than a seven point scale. Maybe we get what we pay for.

The greater part of the effort of this task is spent on whether or not the predicted event has occurred. This space is needed as our measured events are not consistent across respondents. These differential consequences mean that we shift from looking at effects on individuals to looking at effects on distributions. This shift, of course, introduces statistics into our arguments. The need for statistics is compounded by the fact that in most of our distribution effects, the distribution we wish to distinguish overlap.

For example, the experimenter in a classic attitude change study

proposes to move through some manipulation, the respondents from some prior position to a common end point. What she finds is a pre-test score of 3.2 and a post-test score of 4.8 with both distributions having endvalue occurrences. Has change occurred? Well, in the distribution, yes; in all individuals, no. What the prediction demands is that in each and every case, the post-test score be higher (in this example) than the pre-test score. What we settle for is evidence that the group mean has shifted.

That evidence, as we know, will come from the ritualistic rarity-of-the event argument of some statistical distribution curve.

I won't belabor you with the obvious replies to the argument (e.g., failure to meet the assumptions of the distribution; an event is only rare in a group of events not in a single occurrence and the like) except to make two comments:

First, our editors are permitting a shift from viewing a statistical event as an arbitrary decision rule to one which invests greater or lesser credibility (sometimes called rigor) into our findings. Thus, we now have significant findings, very significant findings and highly significant findings on one side of the line, and tendencies, clear tendencies and weak but important support on the other. I have never seen an argument for this degree conceptualization of statistical decisioning; I would certainly like someone to develop it.

Second, we have focused so strongly on distribution events that we now feel little need to verify the utility of our findings in the normal concourse of human communication. A .5 attitude shift or a .30 correlation has gained meaning of its own independent of its meaning in the events we are trying to understand.

Utility of the Prediction

Perhaps our love affair with statistical methods explains the paucity of our arguments for the generality or utility of our findings. These arguments appear in a few paragraphs at the end of the report. Claims are modest.

There would appear to be some benefit to testing our experimental findings in an everyday environment. At least to specify what ordinary occurrences that the findings might help to explain.

Experimental studies in controlled circumstances show only that an event can happen given what are usually the optimal conditions for its presentation. They do not show that the event will happen or that it will happen with any significant frequency. As noted we make the assumption that the transfer and substance is there. We need to verify this assumption in each and every case. In short we need to be constructing arguments that individuals practicing communication can make use of the findings.

The role of experimental research is not description. It is not to explain what is in our data in hand. Experimental research is charged with chosing among alternatives for the most powerful predictor among them. We must meet a criterion of utility less we play only a whiffenpoof game.

CONCLUDING REMARKS

Prospective research has long dominated the study of communication. In many respects it has suffered from that dominant position. It has failed to be reflexive; it has ossified in its thinking while glorifying its methods. Its results are meager in utility. I, for one, welcome the competition from other perspectives--competition for status, time and and dollars. That competition will ultimately show our worth.

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